63. A method according to claim 56 said second heating is performed at a temperature lower than a strain point of said substrate.--

REMARKS

The Office Action of December 21, 1998 was received and carefully reviewed. Reconsideration and withdrawal of the currently pending rejections are requested for the reasons advanced in detail below.

Filed concurrently herewith is a *Request for a One Month Extension of Time* which extends the shortened statutory period of response to April 21, 1999. Accordingly, Applicants respectfully submit that this response is being timely filed.

Claims 24-58 were pending prior to the instant amendment. By this amendment, claims 24, 32, 38, 41, 47, 50, and 56 are amended, and new claims 59-63 are added to recite additional features of the present invention to which Applicants are entitled. Consequently, claims 24-63 are currently pending in the instant application.

Initially, Applicants wish to inform the Examiner that an *Information Disclosure Statement* was filed on December 29, 1998. The undersigned received a Patent Office mail room stamped receipt card evidencing receipt of the IDS of December 29, 1998 on January 11, 1999. Therefore, it is respectfully requested that the Examiner evidence consideration of the references cited in the IDS by providing Applicants with a copy of the initialed Form PTO-1449 filed with the IDS of December 29, 1998 with the next Official Action.

Addressing the Section 112 rejections, claims 24-40, 47 and 56-58 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 24 and 32 are amended herein to properly include "steps of" in the preamble of these claims to provide antecedence specific steps referred to in later claims.

Claims 38 and 47 are rejected as being confusing and ambiguous because the claims allegedly contradict the independent claims 32 and 41, respectively, from which they depend. Although claims 32 and 41 recite that the catalyst material is not added to a second portion of the amorphous semiconductor film, these claims provide that crystal growth proceeds from the first portion to the second portion in a lateral direction during the recited first heating. During this lateral growth, the catalyst material migrates from the first portion to the second portion, thus the catalyst material is contained in the second portion. The specification clearly supports this catalyst material migration on page 13, lines 10-25. (See, also, page 21, lines 4-9.) Consequently, this aspect of the rejection should be overcome.

Claim 56 is also rejected for including the article "a" before the recitation of "crystallinity." Claim 56 is amended accordingly to overcome this rejection.

With respect to claims 31, 40, 49, and 55, the Examiner contends that these claims are confusing and contradictory because "one cannot promote further crystallization by melting whats already there!" As the Examiner notes on page 3 of the Office Action, the first heating must be assumed to produce incomplete crystallization. As a result, the irradiating step to promote further crystallization of the crystallized semiconductor film could certainly take place if portions of the film are not crystallized. This is clearly supported on page

18, lines 4-7 and even more specifically on page 20, lines 3-24 of the specification, where the irradiation step are explained in greater detail.

The surface of the film may also "melt" to provide enhanced crystallization, since there are various degrees of crystallization, e.g. microcrystalline, polycrystalline, etc. As a result, claims 31, 40, 49 and 55 should be considered allowable under Section 112, second paragraph.

Claims 56-58 are rejected under 35 U.S.C. §112, first paragraph, because the specification is allegedly enabling for crystallization using a catalyst and does not provide enablement for crystallization that does not include a catalyst material. The rejection is traversed for the reasons advanced below.

Specifically, Applicants contend that the claims including use of the catalyst material, that is claims 24-55, are directed to one aspect of the present invention, while the claims 56-58 are also another aspect of the present invention. As noted by the Examiner, the specification provides on page 12, lines 9+ that Figure 8 includes a sample that does not include Ni. Page 13, lines 1-9 also provides that electron microscope analysis shows that laser light irradiation is effective in improving the crystallinity of the Si film. This is not limited only to films including the catalyst material, and, thus, can be interpreted to include Sample 6 of Figure 8.

More importantly, this is not, however, the "only" reference in the specification relating to the formation of a semiconductor device without using a catalyst material, as contended by the Examiner. A careful review of the specification provides examples of additional express disclosure of the formation of a semiconductor device using the method of the present invention without the use of catalyst material. On page 40, lines 17-25, it is disclosed that laser irradiation and heat treatment are an aspect of the present invention

without any reference to the use of a catalyst material. Even more compelling, however, is the disclosure on page 43, lines 13-15 and page 43, line 27 to page 44, line 2 of the specification where it is expressly disclosed that the nickel element may be introduced selectively only into the silicon film of the TFTs that will constitute the peripheral circuit area and not in the TFTs that will constitute the pixel area, which are formed "by not using a metal element." (See, page 43, lines 13-15) Therefore, claims 56-58 are clearly enabled by the specification of the instant application.

Cases have held that "if a claim adequately defines patentable subject matter and meets the disclosure and clarity standards of Section 112, then it is proper, even though it may encompass less than what the invention could claim." *Andrew Corp. v. Gabriel Electronics, Inc.* (Fed.Cir. 1988). Because the catalyst is not used in every embodiment disclosed in the specification, the claims should be considered enabled by the disclosure, since one of skill in the art would surely understand how to perform the disclosed process leaving out the step of providing a catalyst element as taught by the specification.

Claims 24-58 are rejected under 35 U.S.C. §112, first paragraph, for containing new matter. Specifically, the Examiner contends in paragraph (4) of the Office Action that the specification fails to teach an open ended temperature range for the second heating step and fails to teach annealing the crystallized Si film in a hydrogen atmosphere.

With respect to the temperature of the second heating in claims 24, 32, 41, and 50, Applicants believe that it is not necessary to recite the maximum temperature limitation in the claims, since the upper limit is dependent upon the substrate material, as provided on page 11, lines 6-10, rather than accomplishing the purpose of the heating step. The recited lower limit is,

however, provided as the more critical limitation for obtaining the desired reduction of defects in the film. Higher temperatures than those provided in the specification could also provide such reduction in the present invention, but are limited only by the substrate used, not the overall defect reduction accomplished by heating.

The specification need not describe the claimed invention in ipsis verbis to comply with the written description requirement *Ex Parte Sorenson*, 3 U.S.P.Q.2d 1462, 1463 (Bd.App.&Int. 1987). As a result, the claims should be considered acceptable in this regard.

With respect to the hydrogenation step, embodiment 4 discloses the hydrogenation after the second heat treatment. Although this hydrogenation step is not performed immediately after the second heat treatment, there is nothing in claims 24, 32, 41 and 50 that requires that the annealing in the hydrogen atmosphere occur directly after the second heat treatment for reducing defects. These claims merely recite that the semiconductor film is annealed in a hydrogen atmosphere after the second heating. Applicants use of the "and then" language merely further emphasizes that the annealing should be interpreted to occur after the second heating.

Specifically, as provided on page 27, line 19, after "the above crystallization step by heat treatment," the crystallinity of film is enhanced by irradiation with light, then a heat treatment is performed to reduce defects (page 28, lines 5-6) and then annealing is performed in a hydrogen atmosphere (page 30, lines 14-16). Therefore, embodiment 4 provides a heat treatment for crystallizing, followed by an irradiation with light to enhance crystallization. As a result, embodiment "1" is not the only disclosure of separate crystallization steps, followed by annealing in a hydrogen atmosphere, as

provided by the Examiner. The fact that additional processing steps are performed in between these last two recited steps should not affect Applicants ability to broadly claim the invention, for the reasons advanced above.

Furthermore, Applicants contend that the steps described in the embodiment 2 can be applied in the embodiment 4, for example, as shown in the specification on page 26, line 13. Since the embodiment 2 comprises the step of heat treatment before irradiating, Applicants contend that the above claims are further supported in the specification.

Also, the Examiner asserts that the hydrogenation of the silicon film is a New Matter, since none of the deposited and treated silicon film are disclosed to be treated by the hydrogen containing atmosphere. However, the purpose of the heat treatment in an atmosphere comprising hydrogen is hydrogenation of the silicon film itself, even though other fabricating steps, for example patterning, gate forming, doping and so on, are interposed between the second heat treatment and the hydrogenation step. The semiconductor film would still be annealed during the "last" step noted by the Examiner in the hydrogen containing atmosphere. As a result, Applicant contend that this added step is fully supported by the specification.

Claims 31, 40, 49 and 50 are also rejected for containing new matter for reciting "melts.". Although the word "melt" does not appear to be expressly used in the specification, the meaning of the word "fuse" is clearly "melt" as shown in Webster's Dictionary on page 925, line 20 (attached). Consequently, recitation of the term "melt" should not be considered new matter.[1]

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1 It is noted that the Examiner objected to the term "fuse" in the Office Action of May 26, 1998.

For the above reasons, Applicants contend that the currently pending claims should be considered allowable under Section 112.

Claims 24-58 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtani et al. US 5543352, in view of Zhang et al 5529937, or in view of Liu et al (826) or Zhang et al (291). Applicants intend to overcome this rejection based on Ohtani et al. US 5543352 (filed on November 16, 1994) by submitting a verified English translation of the priority document No. 6-225851 filed on August 26, 1994.

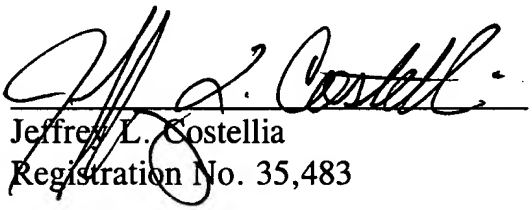
Applicants are currently preparing and will submit the aforementioned translation of JP 6-225851 as soon as it is received by the undersigned.

New claims 59-63 are added to recite additional features of the present invention and recite the maximum temperature limitation for the second heating step. Support for this recitation is provided in the specification beginning on page 1, line 22 and following throughout the specification in the examples when referring to heat considerations of the substrate to prevent bending, damage, etc.

In view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 24-58 be allowed, that new claims 59-63 be allowed and that the application be passed to issue.

If a conference would expedite prosecution of the instant application, the Examiner is hereby invited to telephone the undersigned to arrange such a conference.

Respectfully submitted,



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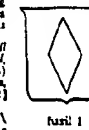
fu·sate \'fyü,zāt\ *adj* [L *fusus* + E *-ate*] : FUSIFORM
fusco- *comb form* [ISV, fr. L *fuscus*] : having a dark color : tawny ⟨*fusco*chlorin⟩ ⟨*fusco*ferruginous⟩
fus·cous \'fəskəs\ *adj* [L *fuscus* — more at DUSK] : of any of several colors averaging a brownish gray which is lighter than taupe (sense 1), lighter and less strong than average chocolate, and less strong and slightly redder than mouse gray
¹fuse \'fyüz\ *n* -s *often attrib* [It *fuso* spindle, fr. L *fusus*] **1** : a continuous train of explosive enclosed in a flexible waterproof cord or cable for setting off a charge (as dynamite) by communication of either fire or detonation ⟨detonating ~s⟩ — see SAFETY FUSE 1 **2** *usu* **fuze** \"\ : a detonating device for setting off (as by percussion) the bursting charge of a projectile, bomb, or torpedo ⟨our new proximity ~ which enabled artillery shells to burst automatically —F.E.Fox⟩
²fuse *or* **fuze** \"\ *vt* -ED/-ING/-S [¹*fuse* & ⁴*fuse*] : to equip with a fuse
³fuse \"\ *vb* -ED/-ING/-S [L *fusus*, past part. of *fundere* to pour, to melt — more at FOUND] *vt* **1 a** : to reduce to a liquid or plastic state by heat : DISSOLVE, MELT ⟨the thunderstorm had *fused* the electric mains —C.K.Finlay⟩ **b** : to blend by melting together : unite by heating ⟨foundries which ~ zinc and copper into hard, bright brass —*Newsweek*⟩ **c** *archaic* : to thin or dilute (the blood) ⟨purgatives are . . . to ~ and thin the blood —George Cheyne⟩ **2** : to unite as if by melting together : BLEND, INTEGRATE ⟨~s the clutter of detail into a rich and fascinating narrative —A.M.Schlesinger b.1917⟩; *specif* : to join (two adjacent bony surfaces) by surgery ~ *vi* **1** : to become fluid with heat : LIQUEFY, MELT ⟨acetate rayon tends to ~ if pressed at too high a temperature —W.L.Carmichael⟩; *specif* : to fail because of the melting of a link in an electrical circuit ⟨all the lights in the house have *fused* —*Christian Science Monitor*⟩ **2** : to become integrated : UNITE, MERGE ⟨the passion for service must ~ with the passion for knowledge —C.W.Eliot⟩ **syn** see MIX
⁴fuse \"\ *n* -s : a wire, bar, or strip of metal with a very low melting point that melts and breaks the circuit when an electric current exceeds a specified amperage ⟨plug ~s . . . have transparent windows at the top which enable the home-owner to see when they are blown —Bernard Gladstone⟩
fu·seau \(')fyü;zō\ *n, pl* **fu·seaux** \-ōz\ [F, lit., spindle, fr. OF *fusel*, dim. of *fus*, fr. L *fusus*] : a fusiform multicellular body that resembles a spore and that is characteristic of various fungi of the genus *Trichophyton*
fuse block *n* **1** : FUSE GAUGE **2** *also* **fuse cutout** : a block of porcelain, slate, or other refractory material supporting a mounting for an electrical fuse
fuseboard \'·,·\ *n* : a slab of incombustible insulating material on which electrical safety fuses are mounted
fuse box *or* **fuse cabinet** *n* : CUTOUT BOX
fuse clip *n* : a spring clip supporting one end of a cartridge fuse and providing electrical connection with it
fused \'fyüzd\ *adj* **1 a** : melted together : united by heating; *specif, of a shirt collar* : stiffened by bonding an acetate interlining to the outside layers ⟨cotton broadcloth with ~ collar that does not need starching —*Eaton's Catalogue*⟩ **b** : reduced to liquid by heat : MOLTEN ⟨plating . . . consists in enveloping the metal with the higher melting point by the ~ bath of the metal with the lower melting point —*Scientific American*⟩ **c** : having atoms in common — used of ring systems in chemical compounds (as benzanthracene) **2** : MINGLED, BLENDED, INTEGRATED ⟨two sentences ~ into one⟩ ⟨a meandering fancy rather than a ~ vision —*Time*⟩
fused quartz *or* **fused silica** *n* : VITREOUS SILICA
¹fu·see *or* **fu·zee** \(')fyü;zē\ *n* -s [F *fusée*, lit., spindleful of yarn, fr. OF *fusee*, fr. *fus* spindle, fr. L *fusus*] **1** : a conical spirally grooved pulley in a timepiece from which a cord or chain unwinds onto a barrel containing the spring, the increasing diameter of the pulley compensating for the lessening power of the spring **2** : ¹FUSE 1 **3** *obs* : a bony growth on the leg of a horse **4 a** : a wooden match with a bulbous head not easily blown out when ignited **b** : a paper match impregnated with niter and tipped with sulfur **5** : a red signal flare used esp. for protecting stalled trains and trucks
²fusee *or* **fuzee** \"\ *n* -s [modif. of F *fusil* — more at FUSIL] **1** : a flintlock gun : FIRELOCK **2** : FUSILIER
fuse gauge *also* **fuse cutter** *n* : an instrument for cutting fuses that consists of a block with a brass scale on one side and a hinged knife — called also *fuse block*
fu·se·lage \'fyüsə,läzh, -läzh *also* -üzə- *or* -läj *or* -ləj *or* ,ˌ·'· *sometimes* '··lij *or* 'fyü(,)sl- *or* -fyüz(,)l-\ *n* -s [F, fr. *fuselé* spindle-shaped (fr. MF, fr. *fusel* spindle + *-é* -ate, fr. L *-atus*) + *-age* — more at FUSEAU] : the central body portion of an airplane designed to accommodate the crew and the passengers or cargo
fu·sel oil \'fyüzəl-\ *n* [G *fusel* bad liquor] **1** : an acrid oily liquid that has an unpleasant odor, that is obtained in small amounts as a by-product in alcoholic fermentation (as of potatoes, grain, or molasses), that consists of a mixture chiefly of alcohols (as isopentyl, active amyl, isobutyl, and normal propyl alcohols), and that is used esp. as a source of alcohols and as a solvent **2** : AMYL ALCOHOL 2a
fuseplug \'·,·\ *n* **1** : a plug fitted to the fuse hole of a military projectile to hold the fuse **2** : PLUG FUSE
fuses *pl of* FUSE, *pres 3d sing of* FUSE
fu·shion \'füzhən\ *var of* FOISON
fu·shion·less \-ləs\ *adj* **1** *Scot, of food or drink* : lacking in flavor or nourishment : INSIPID **2** *Scot, of a person* **a** : physically weak : lacking energy **b** : mentally or spiritually dull
fu·shun \'fü;shün\ *adj, usu cap* [fr. *Fushun*, Manchuria] : of or from the city of Fushun, Manchuria : of the kind or style prevalent in Fushun
fusi- *comb form* [L *fusus* spindle] : spindle ⟨*fusi*form⟩ : spindle-shaped ⟨*Fusi*coccum⟩
fu·si·bil·i·ty \,fyüzə'biləd·ē, -ətē, -i\ *n* -ES [F *fusibilité*, fr. MF, fr. *fusible* + *-ité* -ity] : the quality, state, or degree of being fusible
fu·si·ble \'fyüzəbəl\ *adj* [F or ML; F, fr. MF, fr. ML *fusibilis*, fr. L *fusus* (past part. of *fundere* to pour, melt) + *-ibilis* -ible — more at FOUND] : capable of being fused; *esp* : capable of being liquefied by heat
fusible metal *or* **fusible alloy** *n* : a metal or alloy (as of bismuth, lead, and tin or of these three metals and cadmium or indium) having a low melting point usu. below 300°F and used typically for dies, fixtures, molds, patterns, boiler safety plugs, and automatic-sprinkler fuses
fu·si·cla·di·um \,fyüzə'klādēəm\ *n, cap* [NL, fr. *fusi-* + Gk *kladion* twig, shoot, dim. of *klados* branch, shoot — more at GLADIATOR] : a form genus of imperfect fungi (family Dematiaceae) that produces one-celled or once-septate spores on short conidiophores usu. in extensive groups
fu·si·coc·cum \-'käkəm\ *n, cap* [NL, fr. *fusi-* + *-coccum* (fr. Gk *kokkos* grain, seed, kermes berry)] : a form genus of imperfect fungi (family Sphaeropsidaceae) that have hyaline unicellular fusiform spores in several-chambered pycnidia
fu·si·form \'fyüzə,fȯrm\ *adj* [*fusi-* + *-form*] : shaped like a spindle : tapering toward each end — see ROOT illustration
fusiform bacillus *n* : a rod-shaped bacterium (*Fusobacterium fusiforme* or *Fusiformis plauti-vincentii*) having one blunt and one pointed end and being typically associated in pairs with the blunt ends apposed forming a fusiform figure — see VINCENT'S INFECTION
fusiform initial *n* : an elongated tapering cell in the cambium that through repeated division gives rise to vertically arranged cells — compare RAY INITIAL
fu·si·for·mis \,ˌ·'fȯrməs\ *n, cap* [NL, fr. ISV *fusiform*] *in some classifications* : a genus of parasitic anaerobic or microaerophilic nonmotile bacteria (family Bacteroidaceae) that stain unevenly, form no spores, and are often associated with purulent lesions
fusiform rust *n* : a rust esp. of loblolly and Caribbean pine seedlings caused by a fungus (*Cronartium fusiforme*) that produces distinctive spindle-shaped cankers on the stems
¹fu·sil \'fyüzəl\ *or* **fu·sile** \", -ü,zīl, -,sīl\ *adj* [ME *fusil*, fr. L *fusilis*, fr. *fusus* (past part. of *fundere* to pour, melt) + *-ilis* -ile — more at FOUND] **1** *archaic* **a** : made by melting and pouring into forms : CAST ⟨wrought ~ or graven in metal —John Milton⟩ **b** : liquefied by heat : melted and flowing . . . —Alexander Pope **2** *archaic*

²fu·sil \'fyüzəl\ *n* -s [ME, fr. MF *fusel*, *fusil* spindle — more at FUSEAU] **1** : a rhomboidal heraldic bearing longer in proportion to its width than a lozenge **2** : a spindle-shaped siliceous concretion


fusil 1

³fusil \"\ *also* **fu·sil** \"\ *n* -s [F *fusil* steel for striking fire, musket, fr. OF *foisil*, *fuisil* steel for striking fire, fr. (assumed) VL *focilis*, fr. LL *focus* fire (fr. L, fireplace, hearth) + L *-ilis* -ile — more at FOCUS] : a light flintlock musket
fu·si·lier *or* **fu·si·leer** \,fyüzə'li(ə)r, -iə\ *n* -s [F *fusilier*, fr. *fusil* + *-ier* -er] **1** : a soldier armed with a fusil **2** : a member of one of the British regiments that were formerly armed with fusils
¹fu·sil·lade \'fyüsə,läd, -üzə-, -ˌäd,-ad, ,ˌ·'·\ *n* -s [F, fr. *fusiller* to shoot (fr. *fusil*) + *-ade*] **1 a** : a number of shots fired simultaneously or in rapid succession esp. with small arms : VOLLEY ⟨a ~ of buckshot —Horace Sutton⟩ **b** : FIRING SQUAD ⟨he was condemned to death . . . and died by the ~ —W. O.Scroggs⟩ **2** : a spirited outburst of any sort ⟨a ~ of marimba music —Maud Oakes⟩; *specif* : a barrage of criticism ⟨never . . . has a new head of government come under such a ~ from his own party —*Atlantic*⟩
²fusillade \"\ *vt* -ED/-ING/-S : to attack or shoot down by simultaneous or rapidly successive gunfire
fu·sil·ly \'fyüzəlē\ *adj* [ME *fusile*, fr. *fusil*] **1** : divided into fusil-shaped compartments — used of a heraldic field or bearing **2** : made of a row of fusils — used of a heraldic bearing
fusing *pres part of* FUSE
fusing disk *n* : a steel disk that causes fusion by the heat from its rapid rotation and is used to cut metal
fu·si·nite \'fyüz°n,īt\ *n* -s [alter. of *fusain* + *-ite*] : the opaque carbonized cell structure found in fusain and sometimes considered a mineral
fu·si·ni·za·tion \,fyüz°nə'zāshən, -,nī'z-\ *n* -s [alter. of *fusain* + *-ization*] : the transformation of plant material to fusain
fu·sion \'fyüzhən\ *n* -s *often attrib* [L *fusion-*, *fusio*, fr. *fusus* (past part. of *fundere* to pour, melt) + *-ion-*, *-io* -ion — more at FOUND] **1 a** : the act or process of liquefying or rendering plastic by heat : transition of a substance from a solid to a liquid : MELTING ⟨welds accompanied by ~ are by far the most common —*Welding Handbook*⟩ **b** : the quality or state of flowing induced by this process ⟨that degree of heat must be employed which will give perfect ~ to the glaze —G.R. Porter⟩ **2** : a union by or as if by melting: as **a** : a merging of diverse elements into a unified whole : SYNTHESIS ⟨opera is the ~ of five arts into a composite whole —Warwick Braithwaite⟩; *specif* : the blending of retinal images in binocular vision **b** : a combination of ingredients achieved by beating and mixing together ⟨cement is a ~ formed from exact proportions of shale and limestone —E.S.Perry⟩ **c** : a political partnership : COALITION ⟨a ~ of Democrats and independent Republicans —*N.Y. Times*⟩ ⟨elected on a ~ ticket —F. H. LaGuardia⟩ **d** (1) : a blend of sensations, perceptions, ideas, or attitudes such that the component elements can seldom be identified by introspective analysis (2) : the perception of light from a source that is intermittent above a critical frequency as if the source were continuous — contrasted with *flicker*; see CRITICAL FLICKER FREQUENCY **e** : a coalescence into a solid unit : WELDING; *specif* : the surgical immobilization of a joint ⟨spinal ~⟩ **f** : coalescence between root and affix in a language (as in Latin *pēs* "foot" from assumed earlier *peds* with the root *ped-* and the nominative singular ending *-s*) — compare INFLECTIONAL **g** : the union of atomic nuclei to form heavier nuclei resulting in the release of enormous quantities of energy when certain light elements unite (as in the combination of heavy-hydrogen nuclei to form helium nuclei that takes place in the sun or in a hydrogen bomb) — called also *nuclear fusion*; contrasted with *fission*
fu·sion·al \-zhən°l, -zhnəl\ *adj* : relating to or characterized by fusion; *specif* : being or relating to a process, language, or type of linguistic structure in which fusion occurs
fusion bomb *n* : a bomb in which nuclei of a light chemical element unite to form nuclei of heavier elements with a release of energy; *esp* : HYDROGEN BOMB — compare ATOM BOMB
fusion frequency *n* : CRITICAL FLICKER FREQUENCY
fu·sion·ist \-zh(ə)nəst\ *n* -s [F *fusionniste*, fr. *fusion* (fr. L *fusion-*, *fusio*) + *-iste* -ist] : one who promotes or takes part in a coalition esp. of political parties
fu·sion·less \'füzhənləs\ *var of* FUSHIONLESS
fusion nucleus *n* **1 a** : PRIMARY ENDOSPERM NUCLEUS **b** : the triploid nucleus resulting from double fertilization that produces the endosperm nuclei in seed plants **2 a** : SYNKARYON **b** : ZYGOTE
fusion point *n* : MELTING POINT
fusion welding *n* : the welding of metals in a molten state without mechanical pressure or pounding
fu·site \'fyü,zīt\ *n* -s [*fusain* + *-ite*] : FUSINITE
fuso- *comb form* [L *fusus* spindle] **1** : shaped like a spindle ⟨*fuso*cellular⟩ **2** : fusiform bacillus and ⟨*fuso*spirillar⟩ ⟨*fuso*spirochetal⟩
fu·so·bac·te·ri·um \;fyü(,)zō+\ *n* [NL, fr. *fuso-* + *bacterium*] **1** *cap* : a genus of gram-negative anaerobic strictly parasitic rod-shaped bacteria usu. placed among the Bacteroidaceae and sometimes included in *Fusiformis* — see FUSIFORM BACILLUS **2** *pl* **fusobacteria** : any organism of the genus *Fusobacterium*
fu·so·cel·lu·lar \"+\ *adj* [ISV *fuso-* + *cellular*] : composed of fusiform cells
fu·soid \'fyü,zȯid\ *adj* [L *fusus* spindle + E *-oid*] : FUSIFORM
fu·so·spi·ro·che·tal \;fyü(,)zō+\ *adj* [*fuso-* + *spirochetal*] : of, relating to, or caused by the fusiform bacillus and spirochetes — compare VINCENT'S INFECTION
fu·so·spi·ro·chete \"+\ *n* -s [ISV *fuso-* + *spirochete*] : the associated bacterium and spirochete that are typically present together in Vincent's infection
fu·so·spi·ro·che·to·sis \"+\ *n, pl* **fusospirochetoses** [NL, fr. ISV *fusospirochete* + NL *-osis*] : VINCENT'S INFECTION
¹fuss *n* -ES [origin unknown] *obs* : FUSSOCK
²fuss \'fəs\ *n* -ES [perh. of imit. origin] **1 a** : needless bustle or excitement : COMMOTION ⟨he found a point of vantage and settled himself with all the ~ of an audience in a theater —Audrey Barker⟩ **b** : effusive praise : TO-DO ⟨stand by this old man and make a big ~ over his ability to cook beans —L.C.Douglas⟩ **2 a** : a state of agitation esp. over a trivial matter ⟨in a ~ and a stew all afternoon —Molly L. Bar-David⟩ **b** : COMPLAINT, OBJECTION, PROTEST ⟨no ~ was made in his day if a new writer took from an old one whatever material he found congenial —C.E.Montague⟩ **c** : an angry dispute : QUARREL ⟨as a dying phase of the ~ they are raising a controversy over certain words and phrases —B.J.Hendrick⟩ **3** : an ornamental flourish : DECORATION ⟨printed in Caslon without ~ —*Times Lit. Supp.*⟩ **syn** see STIR
³fuss \"\ *vb* -ED/-ING/-ES *vi* **1 a** : to create or be in a state of restless activity : BUSTLE ⟨a fleet of small tugs . . . ~*ed* up and down continually —Leslie Richardson⟩; *specif* : to shower flattering attentions — usu. used with *over* ⟨the children kissed me and patted me and ~*ed* over me —Polly Adler⟩ **b** : to pay undue attention to small details : PUTTER ⟨~ with his clothes —J.B.Benefield⟩ **2** *slang* : to court a girl : DATE ⟨have the best time in college' dramatics and basketball and ~*ing* and dancing —Sinclair Lewis⟩ **3 a** : to become upset : FRET, WORRY ⟨I know I'm an idiot to ~ but they're two hours late —David Walker⟩ **b** (1) : NAG, COMPLAIN : ARGUE, PROTEST ⟨tears and ~*ing* are hard for a parent to take but some release is better for a child than attempts at Spartan bravery —Dorothy Barclay⟩ (2) *dial* : SCOLD, CHIDE — usu. used with *at* ⟨I don't like to be ~*ed* at in public —Eudora Welty⟩ ~ *vt* **1** : to stir up : ANNOY, AGITATE, UPSET ⟨she ~*ed* one; she was always in a state of emotion —Virginia Woolf⟩ **2** *slang* : COURT, DATE
fuss and feathers *n pl but usu sing in constr* : fanfare and ostentation ⟨official holidays . . . were celebrated with a maximum of *fuss and feathers* —A.T.Bouscaren⟩
fuss·budg·et \'fəs,bəjət, *usu* -əd·+V\ *n* -s : one who fusses or frets about trifles ⟨funny old ~s without much practical . . .⟩

fuss·er \'fəsə(r)\ *n* -s : one that fusses
fuss·i·ly \'fəsəlē, -li\ *adv* : in a fussy manner
fuss·i·ness \-sēnəs, -sin-\ *n* -ES : the quality or state of being fussy
fus·sle \'fəsəl\ *Scot var of* WHISTLE
fuss mill *n* : ATTRITION MILL
fus·sock \'fəsək, 'fəs-\ *n* -s [origin unknown] *dial Eng* **1** : DONKEY **2** : a pudgy or stupid person
fuss·pot \'fə,spät\ *n* -s : FUSSBUDGET
fuss up *vt, dial* : to make pretty : EMBELLISH ⟨*fuss up* the stage with superfluous people and superfluous action —*N.Y. Times*⟩
fussy \'fəsē, -si\ *adj* -ER/-EST **1 a** : nervous or easily upset : IRRITABLE ⟨a ~ manner that covered a nervousness he had never been able to conquer —J.D.Beresford⟩ **b** : full of commotion : BUSTLING ⟨~ . . . locomotives snort and wheeze as they drag heavily laden cane trucks to sugar factories —J.W.Coulter⟩ **2** : provided with an abundance of decorative detail : ORNATE ⟨the white curtains starched and all the ~ gilt handles rubbed up —Helen Shaw⟩ **3 a** : requiring or giving close attention to petty details : METICULOUS ⟨looked like a natural for the ~ bookkeeping routine of an orderly room —Earle Birney⟩ **b** : revealing a finicky concern for niceties : FASTIDIOUS, CHOOSY ⟨a man who was ~ about his food⟩ **syn** see NICE
¹fust \'fəst, 'fəst\ *n* -s [back-formation fr. *fusty*] *dial Brit* : a strong musty smell : MUSTINESS
²fust \"\ *vi* -ED/-ING/-S **1** *archaic* : to become moldy through disuse ⟨sure he that made us . . . gave us not that capability and godlike reason to ~ in us unused —Shak.⟩ **2** *archaic, of food or drink* : to taste or smell moldy or stale
³fust \'fəst\ *n* -s [It *fusto*, lit., trunk (of a tree), fr. L *fustis* club, staff — more at BEAT] : the shaft of a column or pilaster
⁴fust \"\ *dial var of* FIRST
fus·ta·nel·la \,fəstə'nelə, ,füs-\ *n* -s [It, fr. NGk *phoustanella*, dim. of *phoustani* woman's dress, fr. It *fustagno* fustian, fr. ML *fustaneum* — more at FUSTIAN] : a short full skirt of stiff white linen or cotton worn by men (as the evzones) in some Balkan countries
fus·tet \;fə;stet\ *n* -s [F, fr. MF *fustet*, *fustel*, fr. OProv, prob. fr. OCatal *fustet*, fr. Ar *fustuq*, *fustuq* — more at FUSTIC] **1** : SMOKE TREE 1a **2** : the yellow dyewood of the European smoke tree — called also *young fustic*
¹fus·tian \'fəschən, *chiefly Brit* -stiən *or* -styən\ *n* -s [ME *fustane*, *fustian*, fr. OF *fustane*, *fustaine*, fr. ML *fustaneum*, prob. fr. ML *fustis* tree trunk, fr. L, club, staff; trans. of Gk *xylinon* cotton, fr. neut. of *xylinos* wooden, fr. *xylon* wood, club] **1 a** : a strong cotton and linen fabric used for clothing and bedding **b** : a class of cotton fabrics usu. having a pile face and twill weave ⟨corduroys and velveteens belong to a group of filling-faced fabrics known by the old term ~ —John Hoye⟩ **2** : pretentious writing or speech : an inflated style : BOMBAST ⟨pure ~ — an appropriate accompaniment for some melodramatic stage spectacle —Winthrop Sargeant⟩ — often used interjectionally to express disbelief or disdain ⟨nonsense! ~! Good day to you! —S.H.Adams⟩ **syn** see BOMBAST
²fustian \"\ *adj* **1** : made of fustian ⟨a ~ coat⟩ **2** : pompous and overdone : EXAGGERATED ⟨~ antique heroes —H.O. Taylor⟩ **3** : GOOD-FOR-NOTHING, WORTHLESS ⟨a ~ rascal —Leslie Hotson⟩
fus·tic \'fəstik\ *n* -s [ME *fustik*, fr. MF *fustoc*, fr. Ar *fustuq*, *fustaq*, fr. Gk *pistakē* pistachio tree — more at PISTACHIO] **1** : any of several dyewoods: as **a** : the yellow wood of a common tropical American tree (*Chlorophora tinctoria*) — called also *dyer's mulberry*, *old fustic* **b** : FUSTET 1 **2** : the tree that yields old fustic — called also *dyer's mulberry* **3** : the yellow coloring matter extracted from old fustic and used esp. in dyeing wool — see DYE table I (under *Natural Yellow 11*) **4** : ⁴LIME 3
fus·ti·gate \'fəstə,gāt\ *vt* -ED/-ING/-S [LL *fustigatus*, past part. of *fustigare*, fr. L *fustis* club, staff + *-igare* (akin to *agere* to drive, act, do) — more at BEAT, AGENT] **1** : to beat with a stick : CUDGEL **2** : to criticize severely : CASTIGATE — **fus·ti·ga·tion** \,ˌ·'gāshən\ *n* -s
fus·ti·ga·tor \'ˌ·,gād·ə(r)\ *n* -s : one that fustigates
fus·ti·lugs \'fəstē,ləgz\ *n, pl* **fustilugs** [*fusty* + *lugs*, pl. of *lug*] *archaic* : a ponderous clumsy person; *esp* : a fat and slovenly woman
fus·ti·ly \'fəstəlē, -li\ *adv* : in a fusty manner
fus·tin \'fəstən\ *n* -s [G, fr. F *fustet* + G *-in*] : a crystalline compound $C_{15}H_{12}O_6$ obtained from the wood of various plants (as the smoke tree); dihydro-fisetin
fus·ti·ness \'fəstēnəs, -tin-\ *n* -ES : the quality or state of being fusty
fus·tle \'fəsəl, 'fəs-\ *vi* -ED/-ING/-S [blend of *fuss* and *bustle*] *dial Brit* : to fuss and bustle
fus·ty \'fəstē, -ti\ *adj* -ER/-EST [ME, fr. *fust* wine cask (fr. MF, club, stick, tree, cask, fr. L *fustis* club, staff) + *-y* — more at BEAT] **1** *Brit* : impaired by age or dampness : MOLDY ⟨~ hay⟩ **2** : saturated with dust and stale odors : MUSTY ⟨rummage into ~ rooms —Howard Griffin⟩ **3** : old-fashioned or rigidly conservative : ANTIQUATED ⟨a ~ elderly gentleman in a threadbare morning coat —George Bellairs⟩
fu·su·la \'fyüzələ\ *n, pl* **fusu·lae** \-,lē, -,lī\ *or* **fusulas** [NL, fr. L *fusus* spindle + *-ula* (fem. dim. suffix)] : a terminal projection of the spinneret of a spider through which the silk gland opens
fu·su·li·na \,fyüzə'līnə, -lēnə\ *n* [NL, fr. L *fusus* spindle + *-ulus* (dim. suffix) + NL *-ina*] **1** *cap* : a genus (the type of the family Fusulinidae) of large fossil spindle-shaped foraminiferans having a test with 4-layered walls and deeply folded septa and serving as an index fossil in various Lower and Middle Pennsylvanian rocks **2** -s : an animal or fossil of *Fusulina* or a related genus
¹fu·su·lin·id \;ˌ·;lənəd, -;linəd\ *adj* [NL *Fusulinidae*] : of or relating to the family Fusulinidae
²fusulinid \"\ *or* **fu·su·line** \'fyüzə,līn\ *n* -s : an animal or fossil of the family Fusulinidae
fu·su·lin·i·dae \,fyüzə'linə,dē\ *n pl, cap* [NL, fr. *Fusulina*, type genus + *-idae*] : a large family of Paleozoic foraminiferans known from their tests which form a major component of one widely distributed kind of Carboniferous limestone
fu·su·ma \'füsə,mä\ *n* -s [Jap] : a framed and papered sliding door used to partition off rooms in a Japanese house
fut *abbr* future; futures
futch·el *or* **futch·ell** \'fəchəl\ *n* -s [origin unknown] : one of the pieces of wood or metal forming a socket for the pole of a carriage and uniting the splinter bar and the fore axletree
fu·thark \'fü,thärk\ *also* **fu·thorc** *or* **fu·thork** \-thȯrk\ *n* -s [*futhark* fr. the first 6 letters (including *thorn* for *th*) of the Scandinavian and continental runic alphabets; *futhorc*, *futhork* fr. the first 6 letters of the Anglo-Saxon runic alphabet] : RUNIC ALPHABET
fu·tile \'fyüd·°l, -üt°l, *also* -ü,tīl *sometimes* -ü(,)til\ *adj* [MF or L; MF *futile*, fr. L *futilis*, *futtilis* that easily pours out, vain, worthless, fr. *futi-*, *fut-* (fr. *fundere* to pour, melt) + *-ilis* -ile — more at FOUND] **1** : serving no useful purpose : INEFFECTIVE, FRUITLESS ⟨opposition . . . had been so ~ that surrender seemed the only course open —C.L.Jones⟩ **2** : occupied with trifles : FRIVOLOUS ⟨a ~ vain man —John Buchan⟩ — **fu·tile·ly** \-°l(l)ē, -tīl,; -il(l)ē,]i\ *adv* — **fu·tile·ness** \-°lnəs, -īln-, -iln-\ *n* -ES
¹fu·til·i·tar·i·an \(,)fyü,tilə'terēən, -'ta(a)r-, -'tär-\ *n* -s [blend of *futile* and *utilitarian*] **1** : one who engages in futile pursuits **2** : one who believes in the futility of human striving and aspiration — **fu·til·i·tar·i·an·ism** \-ēə,nizəm\ *n* -s
²futilitarian \(;)ˌ·;ˌ·;ˌ·\ *adj* : exhibiting or based on an attitude of futility ⟨~ defeatism of the . . . recent posthumous volume —Fred Rodell⟩
fu·til·i·ty \fyü'tiləd·ē, -ətē, -i\ *n* -ES [L *futilitas*, fr. *futilis* + *-itas* -ity] **1** : the quality or state of being futile : USELESSNESS ⟨the economic ~ of military power —Norman Angell⟩ **2** : an abortive attempt or useless gesture ⟨as startling as the aptness of flower and insect symbiosis are their unsuccesses and *futilities* —D.C.Peattie⟩ ⟨the *futilities* of debate for its own sake —W.A.White⟩ **3** : a lack of serious purpose : FRIVOLITY ⟨the pure *futilities* and unmitigated flirtations of an aristocracy —Walter Bagehot⟩
futilous . . . [L *futilis* + E *-ous*] *obs* : FUTILE

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